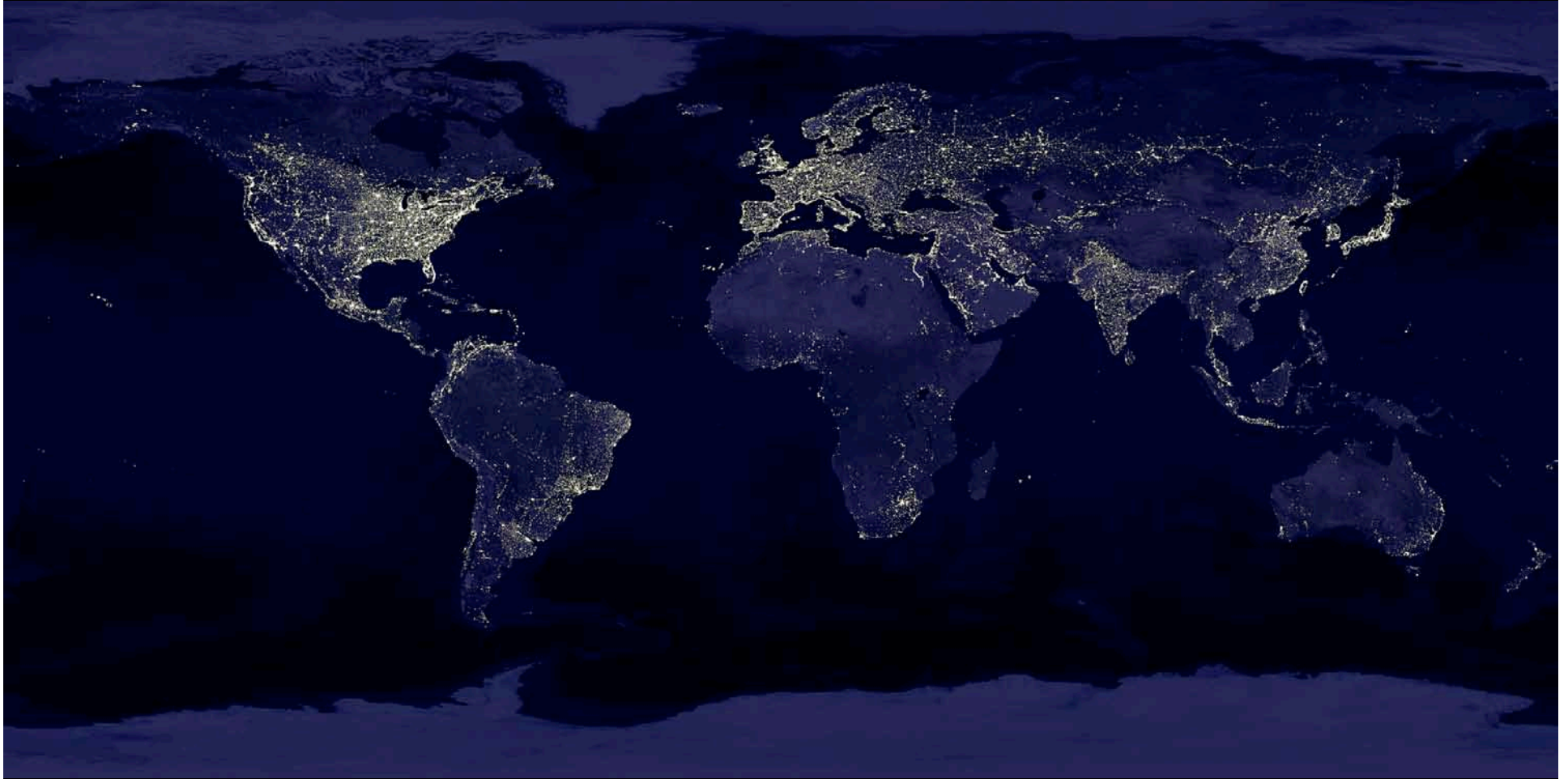


The \$230B Global Lighting Energy Bill



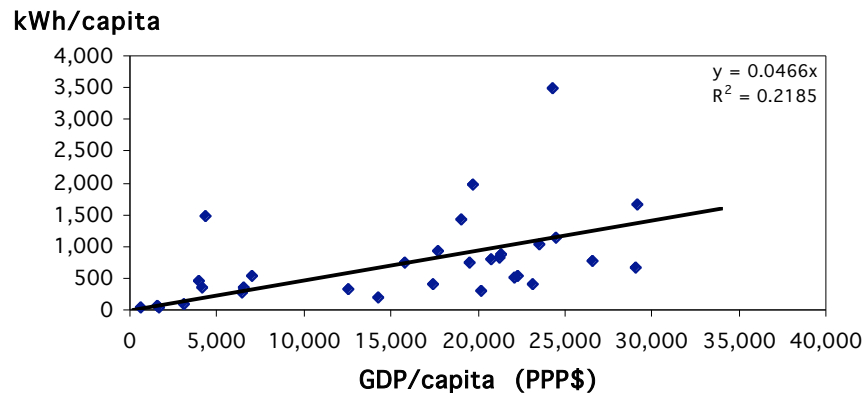
Evan Mills

Lawrence Berkeley National Laboratory

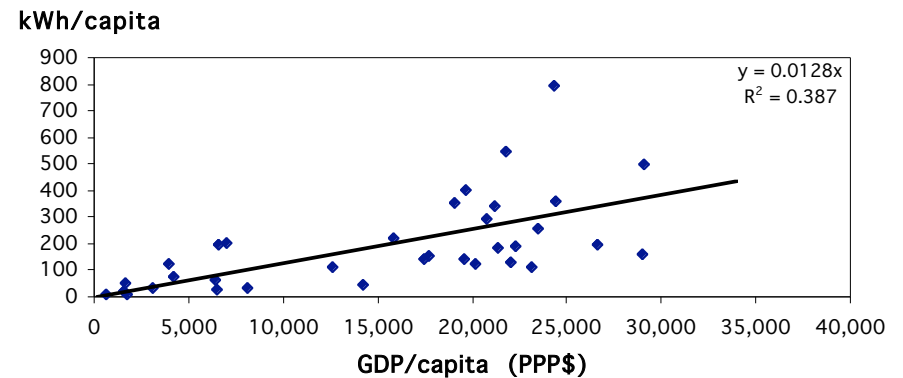
Data: Lighting Correlations

41 countries; 63% of world's population

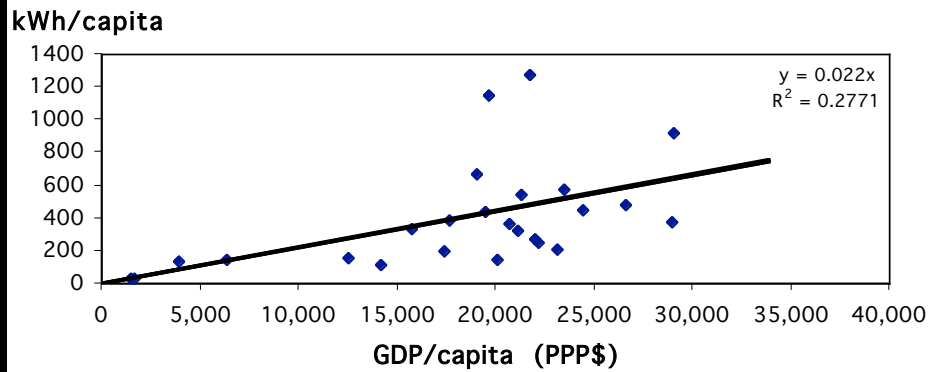
Total Lighting per Capita



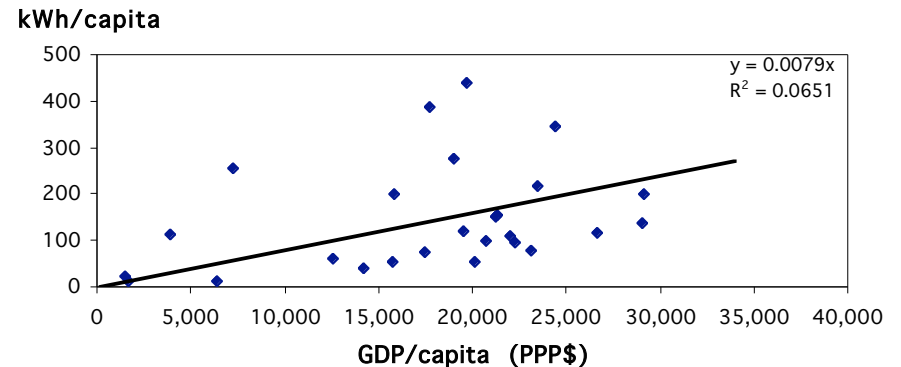
Household Lighting per Capita



Services Lighting per Capita

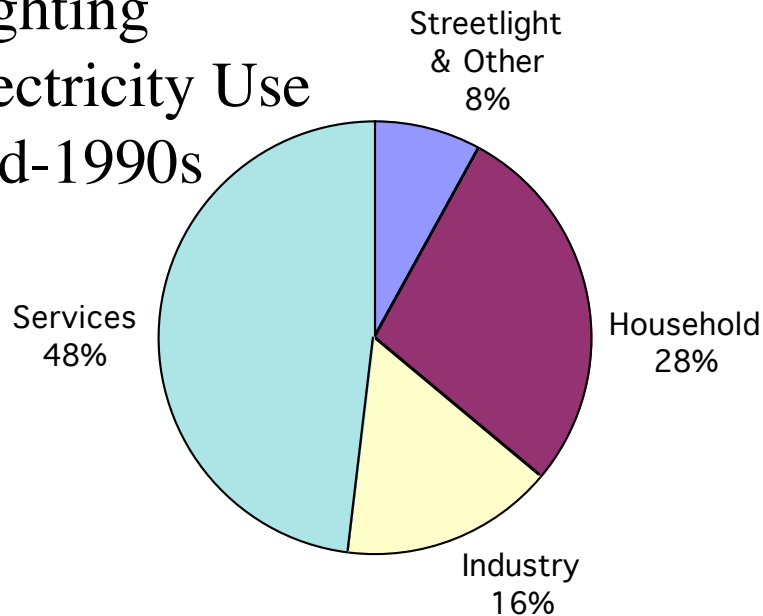


Industrial Lighting per Capita



Global Lighting Electricity: 178 Countries

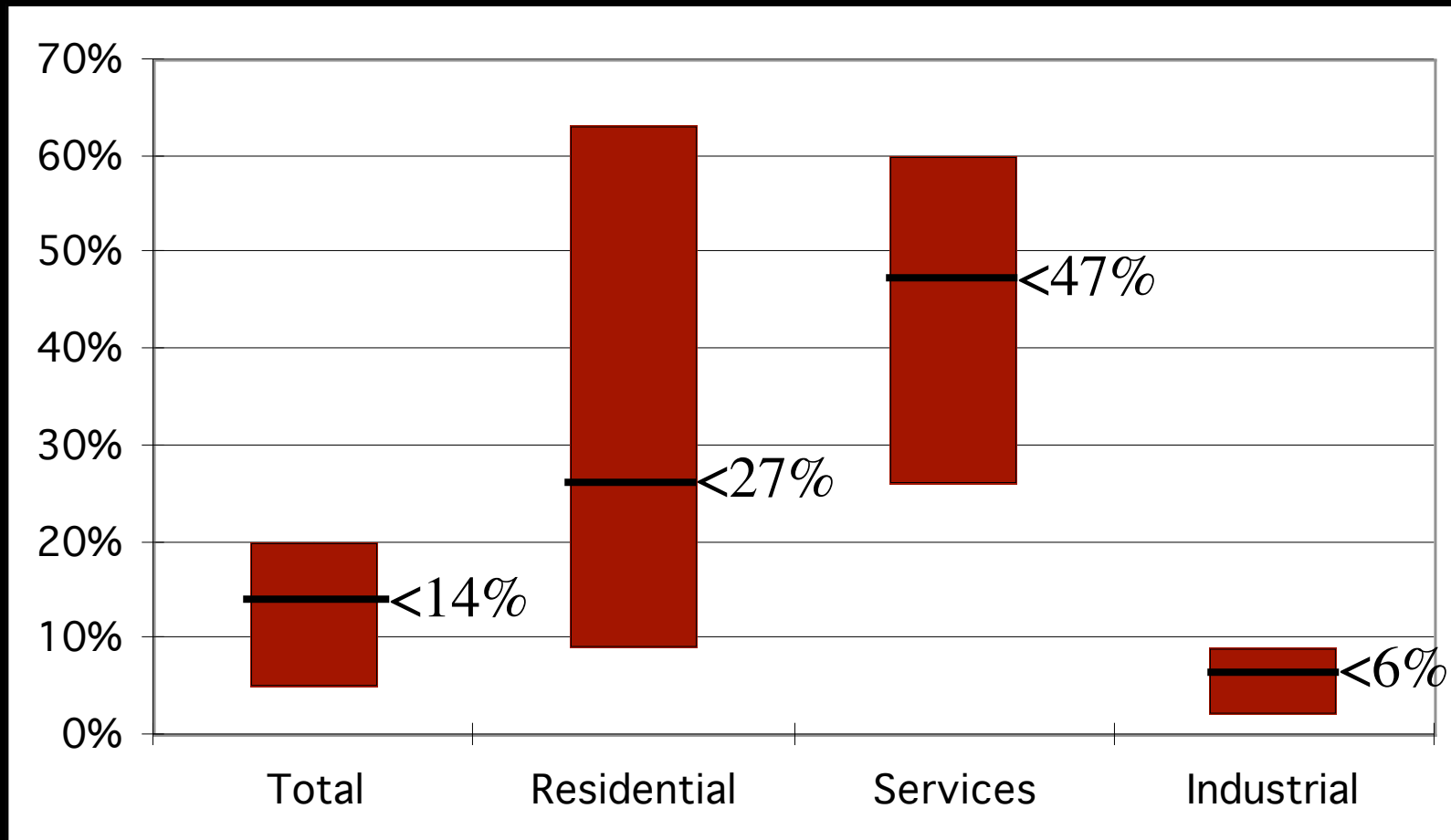
Lighting
Electricity Use
mid-1990s



- Cost: \$185 Billion/year
(~50% in IEA countries)
- Power Plants: ~1000
(400MW each)
- CO₂ Emissions: ~2Bt/year
- Kerosene: 1.7 Mboe/day
(Brazil, Algeria, Libya, or Indonesia)
- Savings: \$75-\$115B/year
(> Canada, France, or Germany TWh)

Conservatism: most estimates go back to mid-1990s; excludes HVAC-interactions; T&D losses at 10%; electricity price \$0.1/kWh; savings potential excludes daylighting

Range of Lighting's Share of Sectoral Total Electricity



2 Billion People (and rising) Use Fuel for Lighting



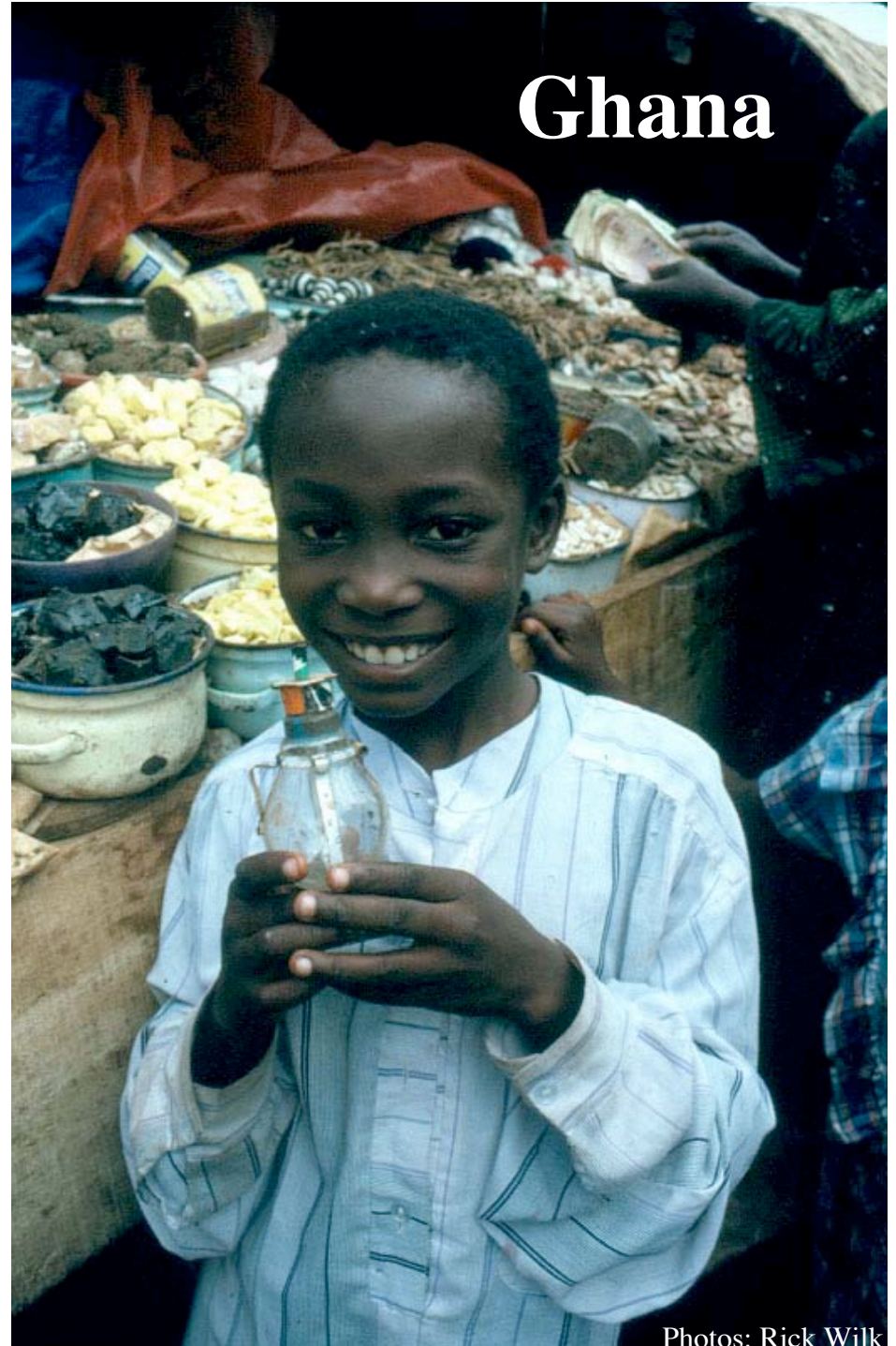
**“We will make electricity so cheap
that only the rich will burn candles”**

- Thomas Edison



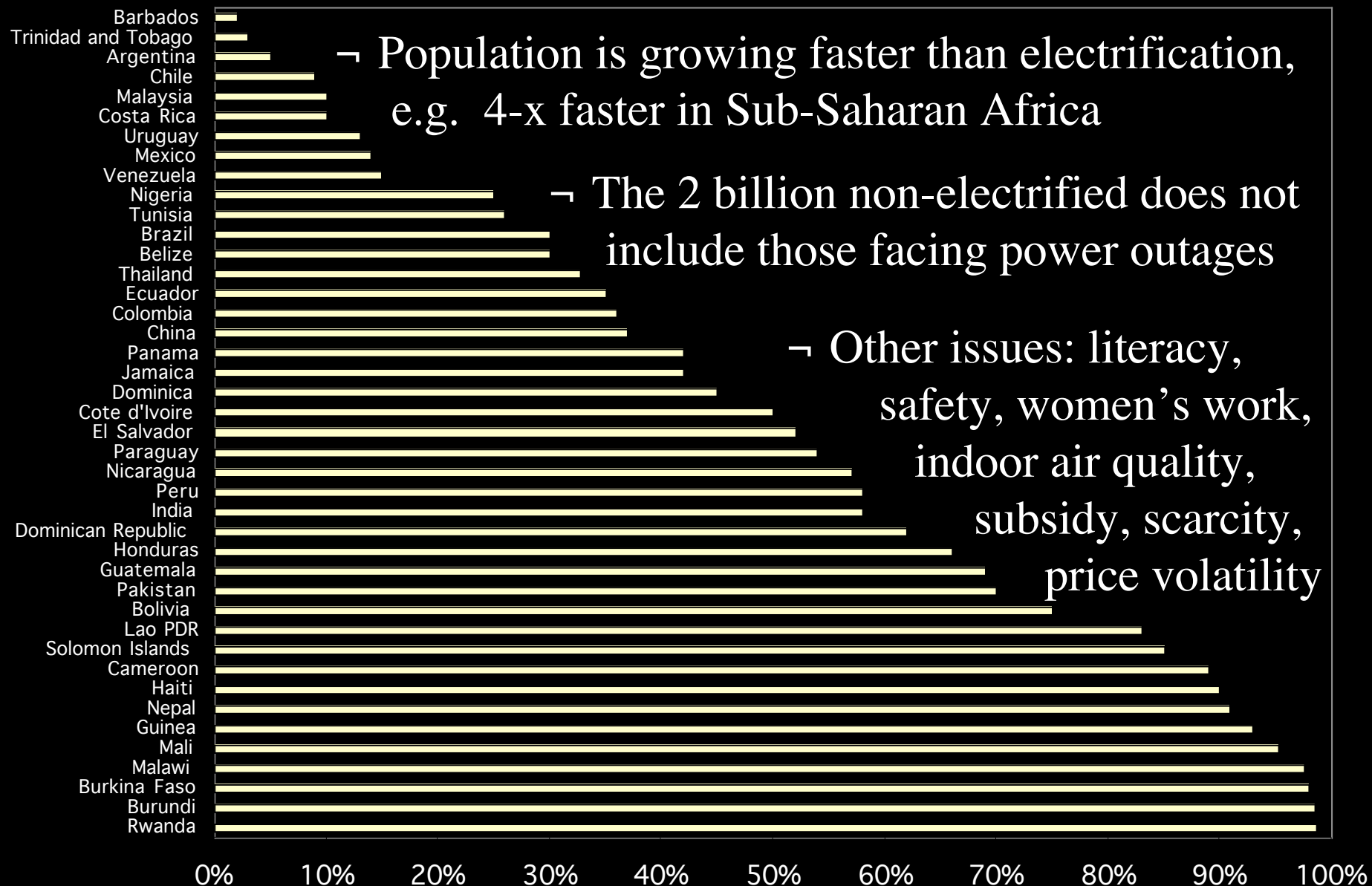
**There are more non-electrified
households today than the total number
of households in Edison's time.**

Ghana



Photos: Rick Wilk

Non-Electrified Population: mid-1990s



An un-electrified household consumes as many lumens over an entire year as a 100W incandescent lamp produces in 10 hours

CFL v Flame

- Electric lamp provides 100-x more lumens
- Kerosene lamp consumes 1200-x more energy per lumen-hour
- Kerosene light costs 1600-x more per lumen hour

Global Residential Lighting Cost

\$B/yr

120

100

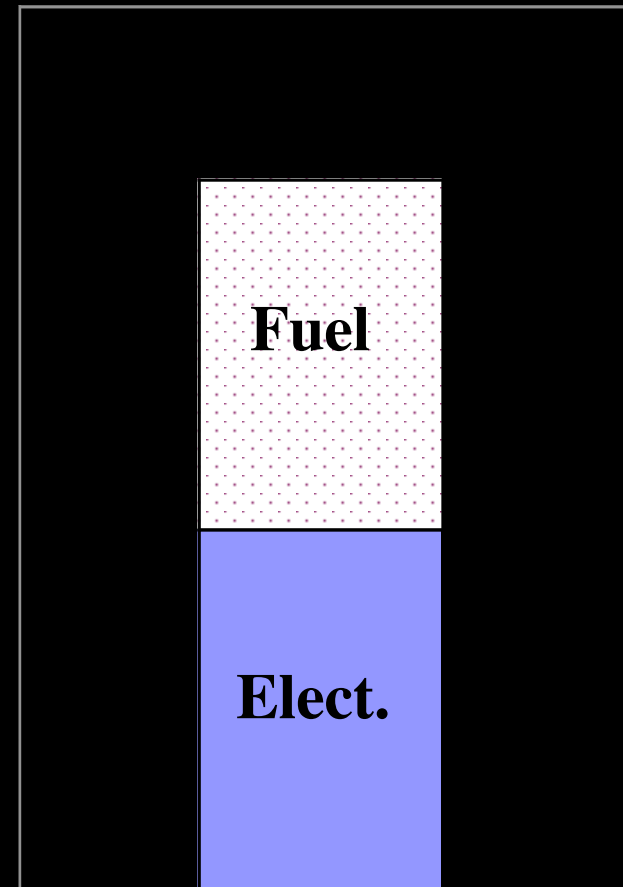
80

60

40

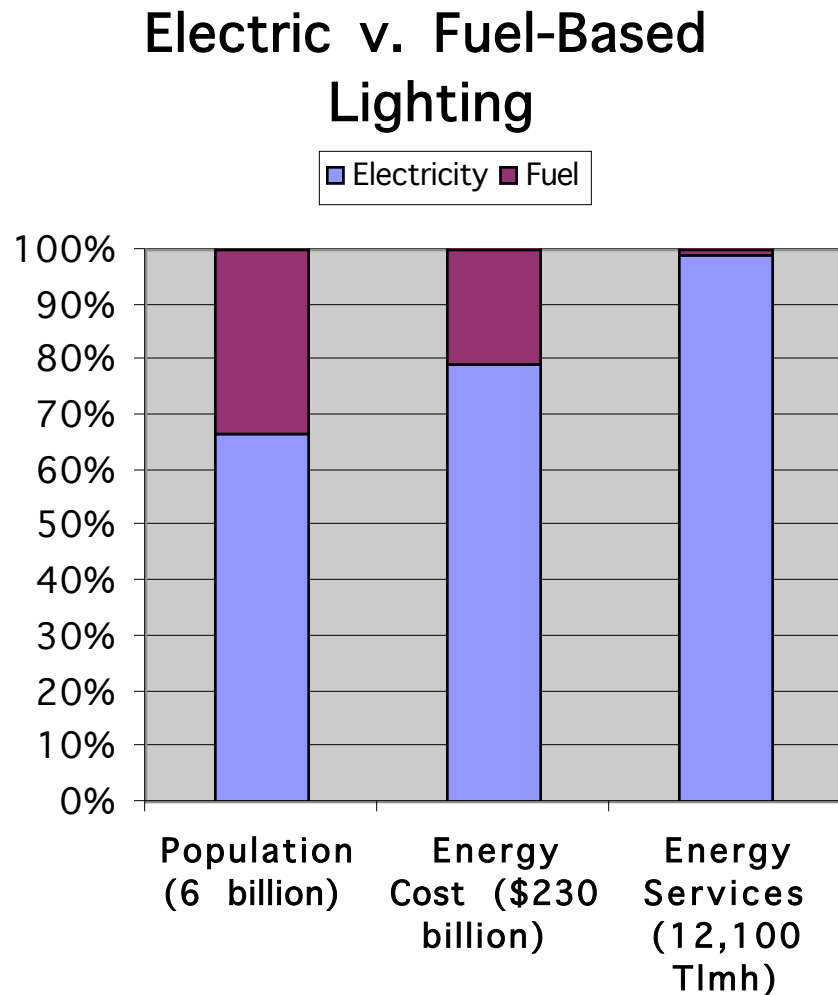
20

0



Lighting Equity

Although one in three people obtain light with kerosene and other fuels, representing about 20% of global lighting costs, they receive only 0.2% of the resulting lighting energy services.



India



Nepal



Next Steps

- **Enhanced data compilation and quality**
- **Further analysis: prediction & potentials**
 - **Validation & refinement of models**
 - **Influence of electricity prices**
 - **Improved estimates of T&D losses**
 - **Non-residential kerosene use**
- **Re-engineering Rural Light Sources**

Everlight

